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## *Says DOD Uses but Neglects Science*

### NSF Director Calls for Major Shifts in Priorities

In a speech unmatched in bluntness by any of his predecessors in the 38-year history of the National Science Foundation, NSF Director Erich Bloch has assailed the Pentagon for "getting a free ride" in its use of basic research. He suggested that NSF might get out of high-energy physics, leaving the field to its main patron, the Department of Energy. And he advised NSF's anxious community of solo investigators that NSF cannot "disregard everything else in favor of single investigator support." Bloch stressed that "we should understand that trying to do everything is to accomplish nothing—and that priority setting is part of our responsibility."

Tinged with anger and reflecting impatience with academe's enduring concept of NSF as a customer-owned bank, the Bloch speech was directly inspired by the Foundation's unexpected budget reverses in the muddled climax of the last Congress (SGR Feb. 1). Instead of the 17-percent increase that was to be the first step in a five-year doubling plan, NSF came out of the budget

Congressional disaffection with research. What came out for NSF was a total untouched by human minds, except for the decision to catch up on education at the unavoidable expense of research.

Bloch's suggestion of a possible NSF withdrawal from high-energy physics could be in the tradition of the so-called Washington Monument Gambit, wherein the National Park Service responds to budget cuts by announcing plans to close the popular tourist attraction on July 4. The physics clan, including the influential particle wing, was deeply involved in the creation of NSF and has always looked upon the Foundation as a safe house amid the uncertainties of Washington. In early postwar days, the main financial responsibility for high-energy physics was assigned to the Atomic Energy Commission, and then its various successors, only because huge budgets were politically accepted without difficulty in

*(Continued on page 2)*

## *Science Post-Reagan: Agriculture—P. 3 Takeovers Slow Industrial R&D—P. 7*

chaos with an overall increase under 6 percent—"barely above inflation," in Bloch's words. But Congress also rearranged NSF's internal accounts, raising the long-neglected education program by 40 percent, while holding the research-supporting directorates to a 4 percent rise—"a cut in constant dollar terms," Bloch noted.

His address, on January 28 to the annual joint meeting of the American Physical Society and the American Association of Physics Teachers, has been reverberating around Washington science-policy circles like no other talk of direct concern to that crowd.

With the White House Science Office having crumbled into insignificance under the stewardship of the furtive William R. Graham, Bloch, who came to NSF three years ago, has emerged as the federal government's leading figure in national science-policy discussions. Retired from an IBM vice presidency, and with a six-year appointment that could span the coming change of administration, Bloch possesses a rare degree of independence for a middle-rank federal official. Coupled with that, his basic message, that science must be enlisted in the competitiveness war, is well received by White House budget planners and on Capitol Hill, NSF's recent reverses notwithstanding. These are attributable to the Gramm-Rudman doomsday machine, rather than to

## In Brief

Following Congressional clobbering of the National Science Foundation budget, along with the customary big boost for the National Institutes of Health, NSF Director Erich Bloch wryly remarked, "Maybe we should get into AIDS research."

Rising scores in the initial evaluation of grant applications are cited by NIH as a major reason for requiring percentile rankings of all applications that study sections forward to the Boards and Councils that have the final say on grants. Now discretionary, percentiling is used in about 80 percent of the cases. The change, to go into effect this spring, "is expected to help stabilize overall priority score distributions, and, in particular, to offset some of the pressures causing rapid increases in the proportion of" superior scores, according to the NIH Peer Review Notes. That's code for panels countering tight money by inflating the scores of favored projects.

After 18 months of publication, *The Scientist*, the twice-monthly tabloid that aims to be the hometown paper of the scientific community, is moving its editorial base from Washington, DC, to the headquarters of its owner, the Institute for Scientific Information, in Philadelphia. The 30,000 circulation remains mainly giveaways and ad revenues have been close to nil. An old dream and pet project of ISI President Eugene Garfield (who holds the titles of President, Publisher, and Editor-in-Chief), the paper has so far run through \$2 million.

## ... NSF No Longer Insulated from Politics, Bloch Say

(Continued from page 1)

nuclear affairs, whereas NSF, in its early days, had to beg and scrape for a bit of growth.

But, Bloch noted in his talk, even with today's Department of Energy putting over \$500 million a year into big and some little physics, NSF, with a total budget of \$1.7 billion for all its scientific and education responsibilities, is still in the physics business—and the pace of NSF physics growth has run ahead of other fields. Last year, Bloch stated, "NSF still provided about 40 percent of the funding for basic physics research at universities and colleges—more than DOE, and more than NASA and DOD combined."

Over one third of the NSF Physics Division budget, \$42 million, he continued, goes to high-energy physics, "but this represents less than a tenth of the total federal support for high-energy physics. This means," Bloch declared, "that NSF provides only marginal support for high-energy physics, yet the amount is a major share of the NSF funds for physics. Perhaps it is time that we consider concentrating resources in those areas of physics where alternative sources of funding do not exist, and thus where NSF could have the greatest impact."

Turning to the government's users and supporters of the basic research and training performed in universities, Bloch singled out the Pentagon for a charge of parasitism. Noting that DOD's share of federal R&D funds has risen from 50 percent to 70 percent over the past decade, he observed that only 2 percent of DOD funds are currently devoted to basic research—"a smaller share than 10 years ago. And virtually none of the Defense money went to science education."

"Yet without basic research," he said, "and without educated scientists and engineers, few of the complex systems the military needs and develops would be possible. . . . Physics research, especially, is the cornerstone of many defense programs. And you, physicists doing basic research, must make this point—and sell the idea to the other funding agencies."

Bloch concluded his speech with an analysis of the political plight of research. Science has failed to convince the public and elected officials that investment in research and education "must take precedence over more immediate political concerns." NSF, he conceded, suffered disappointing growth rather than cuts in the last budget round. "But the bottom line remains what it is. And that is not good. NSF was caught in the political pressures to reduce spending just like everyone else."

Finally, Bloch noted that with research absorbing some 20 percent of discretionary federal spending, the politics of NSF are inevitably changing. "The days of NSF as a quiet, obscure agency, insulated from political pressures, are gone. We should welcome this," he said.

### Steps for Getting By on Less

NSF has disclosed further details of its plans for coping with its budget disappointments, and they add up to quite a few changes.

- The expansion of the Engineering Research Centers program will be limited to "probably" two rather than the four originally scheduled for this year. The program of Science and Technology Centers, which was to get underway this year, will be postponed to next year. However, the Foundation will continue its partnership with the Department of Agriculture and the Department of Energy for establishing a Plant Science Center, and "a few awards" will be made in the Biological Research Centers Program.

- "Some ships in the academic fleet will be taken out of service," but most other activities in the geosciences will be untouched or little changed.

- Studies underway in policy research and analysis will be completed, but "No major new studies will be undertaken."

- Research support will be "marginally" increased for computer and computation research, robotics and intelligent systems, and microelectronic systems.

- The program of visiting professorships for women will be increased slightly, an unspecified number of Minority Research Centers of Excellence will be established, and funding for the program of Research Improvement in Minority Institutions will remain intact. However, the program of Research Career Innovation and Development will not be started.

The NSF research directorates will all receive a bit more than they had last year, but far less than was expected when, with great optimism, the 1988 budget was drawn up late in 1986. For example, the Directorate for Mathematical and Physical Sciences received \$464 million in fiscal 1987. It was planning on a \$51 million increase this year, but it's getting an increase of only \$7.5 million.

The big winner was the Science and Engineering Education Directorate, which Congress boosted from \$99 million to \$139 million, rather than the \$115 million requested by the Administration. Teacher improvement programs will rise by \$15 million, to a total of \$45 million, and curriculum development will gain about \$8 million, bringing it up to \$37 million. In addition, a new program for undergraduate science and education will start out with \$19 million, rather than the \$15 million of the original plan.

# Science Policy Post-Reagan: Agriculture's Unmet Needs

*Orville C. Bentley was Dean of the College of Agriculture at the University of Illinois, Urbana-Champaign, when he was appointed in 1982 to the newly created position of Assistant Secretary of Agriculture for Science and Education. His jurisdiction, budgeted at about \$1.2 billion a year, extends to the Agricultural Research Service, the Cooperative State Research Service, the Extension Service, the National Agricultural Library, and the Office of Grants and Programs Systems. These components have been battered by the Reagan assault on domestic spending, allegations of scientific backwardness, and Congressional pork-barrel raids—creating perhaps the most turbulent period in the long history of federal agricultural research. Bentley spoke with SGR Editor Greenberg on February 4. The following is from that conversation, transcribed and edited by SGR.*

**Q.** *It's widely said, in and out of agriculture, that agricultural research is seriously underfinanced.*

**Bentley.** We see so many things that we could do that we probably have an insatiable appetite for money. But from the standpoint of the nation, I think we are underfinanced, particularly for the kind of research we need to retain a competitive position. We have to begin to think a little bit differently. So much of research has been justified on whether you get more bushels per acre. But maybe what we should be looking at isn't so many more bushels per acre or output, but the efficiency

*Second of a Special SGR Series. (The initial interview, with Frank Press, President of the National Academy of Sciences, appeared Jan. 15, 1988).*

and the cost effectiveness of it and the environmental impact. There's where we need the basic research, and where I think we're underfunded. We also need the basic studies to train the young men and women for the future.

**Q.** *How much money is needed?*

**Bentley.** In the Cooperative State Research Service, I would not hesitate at all to say that this country would be well served if we doubled the competitive grants program, to about \$100 million. Now, some people will say that's a piker's attitude. But if we can build in that direction, there would be benefits from it. In the Agricultural Research Service budgets, I don't want to see a huge buildup of new scientists. What we need to do is support the people and the facilities we have more effectively than now. Increases in the 10- to 25-percent range could be used very well. ARS is on a \$500-million base right now. We've been asking for increases on the order of \$25 to \$50 million. In ARS, we could easily use 20 percent increases, and use them well to get some of our nutrition labs up to full strength, to modernize some of our laboratories so that we

can do the kind of research that we need to do right now. From the standpoint of government spending, these are relatively modest increases.

We could make grants available for students at universities—stipends to encourage good students to go into science and teaching. There are some smaller schools that have terribly difficult budget situations. We ought to help some of those schools. If we had a little more money, we could get some excellent students.

Some of the National Research Council reports on biotechnology said the United States would be well served if the competitive grants program for biotechnology and agriculture and natural resources went up to \$500 million. I think we could use this, but I'm talking about going to \$100 million or \$150 million. That's not an unreasonable amount of money, and I think we could take it over time, because one of the worst things we could do would be to try to build these programs too fast.

**Q.** *There's a lot of talk about improving competitiveness. I hear that many representatives of foreign firms and governments regularly visit the US national laboratories, including yours, but that you don't see many people from American industry coming in to examine what might be useful for them. Is that true?*

**Bentley.** I'm afraid that's true. We've got a lot to do to improve our own technology transfer. Also, we all of a sudden find that there are people who are our equals, who are excellent scientists, in many countries. And that's not restricted to only the developed countries. I was in a laboratory in China where they had a whole group doing tissue-culture work with horticulture plants, fantastic work. And they were coming up with new materials all the time.

On the other side, there's the problem of protection of intellectual property. I think Dr. Graham and OSTP [William R. Graham, Director of White House Office of Science and Technology Policy] is absolutely right

*(Continued on page 4)*

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## ... Responding to Recommendations on Peer Review

(Continued from page 3)

when he raises the question about what kinds of policies we should use to govern this. In agriculture, we previously didn't worry about that too much. We just shared information. But biotechnology came along and pretty soon, knowing about protein sequences and how to clone material became a marketable entity that could be put into the commercial line quickly. And so, in agriculture, we're facing some of the questions that we used to think were more a matter for defense-related issues or high-level computers.

Where we have to look in all the sciences, including agriculture, is how do we accommodate to the legitimate pressures for more concern about technology transfer. Investigator science is driven by carrying on a piece of work and publishing the result in a peer-reviewed journal. But we also now are being called upon by industry, academe, and government—the President says we shall carry this out—for the transfer of technology.

*Q. USDA is always under pressure from your academic friends at the National Academy of Sciences to adopt the peer review style of NIH and NSF. The answer here is that we're a different type of organization. But why can't you do that?*

**Bentley.** I'm well aware of the recommendations and the response. In our competitive grants program, I suspect we're operating very much like that; in other words, it's investigator-driven, although we do have some of our funds assigned to categories for which we're looking for proposals.

In ARS, we funded a study by the Academy of the peer review process (*Improving Research Through Peer Review*—SGR Aug. 1 and Sept. 1, 1987). We got some very good suggestions there, some of which are being followed now. But one of the problems that we have in moving completely to a peer- and investigator-driven selection is that we are mandated by law to do certain things. For example, we work with the FSIS [Food Safety and Inspection Service] on questions having to do with poultry inspections. When we are mandated to do those things, we have to go and work on food safety questions. You can't peer review the choice of topic. We're told to do it. Within that, we have a very vigorous peer-review process for the evaluation of the science once it's underway or has been done. We think we're applying a peer review process. However, we're also conscious of the fact that it has to be improved on.

One of the areas where it has to be looked at is earlier in the process to evaluate the alternatives when you get down to the bench level. So, we're doing it partly this way, but not as much as some people in pure science think we should be doing.

*Q. ARS has gone through many changes.*

### *Ag's Small Share of R&D Growth*

While the total federal budget for research and development has risen from \$29 billion in 1980 to an estimated \$65 billion this year, spending on agricultural R&D has increased at a far slower pace. Agriculture remains a poor relation in the national R&D enterprise.

In 1980, the Agricultural Research Service, the inhouse R&D arm of the Department of Agriculture, was budgeted for \$350 million. This year, it's up to \$540 million. The Cooperative State Research Service ran on \$184 million in 1980; today it's at \$303 million. Over many budget cycles, the Administration sought substantial reductions in agricultural R&D but was thwarted by Congress.

According to the National Science Foundation, the Defense Department and other national security agencies have absorbed about 90 percent of the increase in federal R&D expenditures over the past six years.

At the outset of the Reagan Administration federal R&D spending was about evenly balanced between civilian and military functions. Since then, military spending has increased to the point where at least 70 percent of all federal R&D spending is now in national security programs.

**Bentley.** In ARS, they've attempted to tighten their organization up. It's been a difficult period to go through. Now, they are in a position to be very responsive to issues—insofar as they can be. After all, you can't just change from one topic to another, especially some of the regulatory issues. We were part of a change that was taking place on its own, but we were a part of it. Biotechnology illustrates that point. It's not a science unto itself. It is a powerful new tool to do the kinds of things that we've been doing for years, whether it's in plant genetics or biological control of insects and diseases.

There's a lot of work in biotechnology being done in the ARS that's not directly identified as such. That's in the order of \$25 million worth of work. It's identified as plant genetics, plant stress, disease control, and all these kinds of things. We could use more funds. The panels that review proposals are saying we have to cut back on the number of projects we can fund. We could use funds for probably a factor of two times more projects that are excellent and meet the criteria. Also, we could have more funding for each project. I know that there's a budgetary crunch, but still, that's a disappointment. That's on the unfinished agenda.

(Continued on page 5)

## ... Danger of Spreading Research Support too Thin

(Continued from page 4)

**Q.** Initially, there was serious resistance to competitive grants in the agriculture research community. How are they regarded now?

**Bentley.** My sense is that they're very well accepted, and particularly, I believe, because more scientists and administrators in the system see how the competitive grants are an integral part of what they're trying to do. I seldom hear the question now of them being competitive with the formula grants.

**Q.** What disappointments have been experienced here in policy, politics, and budget matters?

**Bentley.** There's been kind of a mixture of all those. I'd like to have seen more for competitive grants. We talked lots of time about budget reductions, and that led us into a great deal of discussion with the Congress on our efforts a few years ago to cut the Extension budget support to the states. I would rather we could have approached it more on a discussion basis and not had the confrontation. We used up a lot of our energy and a lot of our relationship and the change didn't take place. Congress replaced the budget. I think we were destined to lose before we started. That's bygone. We're not doing that this year, and I'm delighted with that.

### Existing Labs Lack Support

There's a dialog with Congress again on earmarking or designating of funds [thus bypassing the Department's role in selecting projects]. Obviously, Congress has the power and the right to do this. We shouldn't be upset that people raise issues that they think are important for them. Maybe we should have some earmarking, but maybe we ought to be thinking about some earmarking that might serve a broader interest.

**Q.** Looking over the most recent earmarked appropriations [SGR Feb. 1], it didn't seem there was anything unworthy among them.

**Bentley.** I agree. I might not think some of them are as important as something else, but somebody did in some place. But let's get into the question of how many of a given facility or a given kind of laboratory we need. Several labs that we have now might be more efficient and more effective with some additional support. And we might focus attention on some of the newer areas where we don't have as much in facilities as we could use. Almost every state has some major effort in biotechnology. I understand that. There's a desire to help universities develop the expertise to utilize biotechnology in the pharmaceutical industry, in agriculture, and health. On the other hand, we don't want to begin to create facilities to the point where we have more than

we can support. We have a problem in this country of overdoing some of these things.

**Q.** What's being neglected while research money is spread around politically?

**Bentley.** I think, for example, we've got to go back and look at the whole broad area of post-harvest technology, including new uses and alternate uses for agricultural products. Maybe we ought to be getting some specialized facilities that would address new ways of studying the chemistry of fats and oils and carbohydrates. We've got utilization labs doing that. But the problem is not just for some chemist or computer scientist or biologist working in the lab. It's a big issue that involves a lot of different people.

We have a lot of questions that deal with water pollution and quality. Agriculture is looked at by some as the culprit and others say, no, we're doing this for a humanitarian need of producing food and fiber and therefore it's not such a problem. There are some very complex scientific issues to look at when you think about the migration of these large organic molecules, such as pesticides. How do we maintain water quality and still maintain our agriculture production system? These are some of the subjects where we could make use of additional resources.

**Q.** There are reports in the press that the Beltsville [Md.] Agricultural Research Center is literally falling apart.

**Bentley.** Beltsville is one of those facilities that were put together about the time the Pentagon was built. A lot of those buildings are outliving their usefulness, and they are construction of a type that's not easy to change. We've had remodeling and changes to the point that it isn't very cost effective. We need to think about a long-range improvement program for Beltsville. That's what we're working on.

But it's not just replacing or repairing a given facility that we should be concerned with. It's important to look at what's appropriate for the 1990s at Beltsville. We've got new facilities for ARS around the country. We should begin to look at what's unique and special to that Center. It's going to take several tens of millions of dollars to do that. And I think it's justified, if we do it on the basis that it fills unique needs that are not now being taken care of, not just a duplication of some other ARS facilities or a duplication of things that are going on in land grant universities.

We'd like to do something. However, we have a hard time getting funds. It's amazing how much deferred maintenance there is in the centers. It's been a problem in the universities, too. We've lived off capital too long.

(Continued on page 6)

## ... A Tradition of Thinking Small in Research Plans

(Continued from page 5)

**Q.** What other innovations would you like to see in the ARS labs?

**Bentley.** We need to have more emphasis on longer term, more fundamental studies that are risk taking, i.e., a scientist following up on a given area that may not be answering some specific question, but if you understood it better, it might be the key to getting at one of the old problems—whether it's boll weevils or nematodes, or viruses in plants. At the same time, we have to give more recognition to the role of the scientist—maybe not the same one—in taking the most fundamental science and doing what some people called applied science: Helping to take the science and move it toward commercialization. I don't think of it just in terms of making a profit or earning the money back, but I think of it in terms of the competitive position of the country.

We have to do more about training in our research centers. We now have opportunities for 200 postdocs in the ARS labs. Before 1981, we didn't have a formal program. That doesn't mean there weren't postdocs working, but now we're making it an overt action to go out and get people. They're being financed as part of ARS's research program. That's been a typical pattern for the National Institutes of Health. We haven't done as much of that as we should in our labs.

**Q.** Agriculture has powerful political friends in Congress, and the public supports it. Why doesn't this produce greater financial support for agricultural research?

**Bentley.** Within agriculture, there's competition for money. The farm programs are really dealing with immediate problems—what's facing farmers in 1988, not something that's out five or ten years, which is what research regularly deals with. Second, those of us who are responsible for research have always sold it on a very utilitarian basis: bigger yields. We've tended to build our justification on immediate application and immediate response, and we've been very successful.

Now we're coming to new kinds of problems—dealing with the environmental issues, with basic biology, and biotechnology. And many people don't see the scientist in the laboratory looking at a cell under the microscope as being directly related to solving the problems of agriculture, the practical problems. We know this and we're very sensitive about it.

**Q.** The professional image of agricultural science isn't the most glittering. Agriculture is poorly represented in the National Academy of Sciences, and it's generally regarded as not being in the upper echelons of scientific quality. What do you do about that?

**Bentley.** Sometimes in our egalitarian goal of wanting to serve agriculture, we haven't put enough emphasis on the fact that we're part of science. The image is chang-

ing. But we've got to do more. For example, there's talk about mapping the human genome. Shouldn't agriculture be talking about mapping the genome of cattle, for example?

**Q.** Why aren't you talking about it?

**Bentley.** Why? Because, up until now, those are not topics that fit into our scheme of things. We think so modestly in terms of money. To think of \$500 million to start this project is something we haven't done because of the way we function. I think we have to change that.

## Attack Resumes on Super Collider

With Congress back in session, a renewed attack on the Superconducting Super Collider (SSC) has been mounted by Rep. Don Ritter, of Pennsylvania. As a Republican in the heavily Democratic House, Ritter lacks political swat, but he commands some attention and respect as the only PhD in Congress (MIT, in physical metallurgy). Specializing on issues involving technology and federal policy, Ritter is the ranking Republican on the Investigations and Oversight Subcommittee of the Science, Space, and Technology Committee, and he is Chairman of the House Republican Research Committee's Task Force on High Technology and Competitiveness.

In a recent letter to SGR, and an accompanying article submitted for publication, Ritter says that the politics of the SSC has shifted since the number of competing sites has been sharply narrowed in the process toward a final selection. "What's changed in the debate," Ritter notes, "is that now only seven states are left in the competition to host the SSC. California, thought to be a leading contender, isn't one of them. Nor is New York, which dropped out of the competition. I expect that Members of Congress from the eliminated states, and other members who are interested in a competitive future for American science, will join me in rejecting further funding for this 'quark barrel' project."

In his article, the Congressman reports that he expressed his reservations about the SSC in a letter to the Industrial Research Institute. "The response from IRI members has been sobering," he writes. "Many of the members have written to me personally to express their grave concern for the future of American science if the SSC is built. The response from Mr. Kumar Patel, Executive Director of Research for AT&T Bell Laboratories, is typical. Mr. Patel writes that '[o]ur nation's international status in manufacturing . . . is slipping,' and concludes that we should put the SSC 'near the bottom of our priorities.'"

Whether or not the SSC would eat up science money is debatable, as is the extent of opposition claimed by Ritter. But in Congressional budget circles, a consensus is gathering on one point about the SSC: there's no money around to pay for it.



## Job Changes & Appointments: Oak Ridge Head, COSSA, IOM

**Herman Postma** stepped down February 1 as Director of the Oak Ridge National Laboratory, a job he had held since 1974, and has been appointed Senior Vice President of Martin Marietta Energy Systems, Inc., manager of ORNL for the US Department of Energy. **Alex Zucker**, ORNL Associate Director for Physical Sciences, has been named Acting Director.

**David Jenness** has resigned as Executive Director of the Consortium of Social Science Associations (COSSA), the Washington lobby for the soft sciences. A COSSA announcement says he left because "differences have arisen"—which means he didn't get on with the chiefs of the professional societies that dominate the Association. Jenness, a psychologist, held the post since 1984. **Howard Silver**, of the COSSA staff, has been appointed Acting Director.

The Institute of Medicine, a wing of the National Academy of Sciences, has named a committee to monitor national policies and programs for AIDS. The Committee is likely to be influential, given the chronic rudderlessness of federal AIDS policy and the widespread attention accorded the IOM's 1986 report *Confronting AIDS*. The committee will be updating the report for a new edition to be published next summer. Members are:

**Theodore Cooper** (Chairman), Executive Vice President, Upjohn Co.

**Stuart Altman**, Professor of National Health Policy, Brandeis University.

**David Baltimore**, Director, Whitehead Institute.

**Christine Gebbie**, Administrator, Oregon Health Division.

**Donald R. Hopkins**, Task Force for Child Survival, Carter Presidential Center.

**Kenneth Prewitt**, Vice President, Rockefeller Foundation.

**Howard Temin**, Professor of Oncology, University of Wisconsin School of Medicine.

**Paul Volberding**, Director of AIDS Activities, San Francisco General Hospital.

### NSF Update on International R&D

**International Science and Technology Data: Update 1987**, (NSF 87-319) one of the most illuminating collections in NSF's large and varied statistical series, is off the press. Aficionados of such stuff would be wise to order one quickly.

The 74-page report compares R&D-related data in France, West Germany, Japan, Britain, and the US. Items covered include the amounts spent in each on various R&D objectives, education levels of population, patents, productivity, and trade figures.

The report is available without charge from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4634.

### Takovers Slow Industrial R&D

Industrial R&D spending in 1988 will nose up a bit from the slow decline of recent years, for a 3 percent real increase, but R&D managers say higher rates are blocked by "dampened growth in sales and profits and corporate mergers, acquisitions, divestitures and restructuring." That, according to an announcement from NSF, is a basic finding in its forthcoming sixth annual report on corporate R&D spending plans.

Following real average increases in industrial R&D of 5.5 percent from 1980-84, spending is expected to work out to an average increase of 2.5 percent over 1985-88. The data come from surveys of 86 firms, including 15 of the top 20 in R&D expenditures.

NSF notes that "there is some evidence that corporate mergers have contributed to slower growth rates. After taking inflation into account, the 18 firms that participated in mergers, acquisitions, divestitures, and restructurings will not have increased research and development spending for the years 1984 through 1988. A majority of these 18 companies will have decreased research and development spending during at least one of the years following reorganization."

The full report on industrial R&D spending is titled *Economic Outlook and Corporate Mergers Dampen Growth in Company R&D*. It is expected to be available early in March, at no charge, from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4622.

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**State Technology Development Programs in the South** (60 pp., \$12), published by the Southern Technology Council of the Southern Growth Policies Board, provides details on scores of programs in the 12 member states in which R&D, education, and money are supposed to be the yeast for economic growth. The Council is one of the most active of the many organizations around the nation pursuing this strategy. In addition to this publication, it has produced many others; titles on request.

Southern Growth Policies Board, PO Box 12293, Research Triangle Park, North Carolina 27709; tel. 919/941-5145.

**Directory of Federal Laboratory and Technology Resources: A Guide to Services, Facilities, and Expertise** (280 pp. \$36, plus \$3 handling; Order PB88-100011/KCS), a guide to what's available in the federal lab empire, now getting political heat to do more for industry and business. Prepared by the Center for the Utilization of Federal Technology, part of the National Technical Information Service, the directory describes the research programs in hundreds of labs and gives the names and phone numbers of contacts. This edition, third in the series, is the first out since passage of the

Technology Transfer Act of 1986 and a Presidential Executive Order and proclamation last April of an "open door" policy for industry at federal research facilities.

NTIS, Springfield, Va. 22161; tel. 703/487-4650.

**Getting More Out of R&D and Technology Management** (53 pp., \$75 for non-members, Research Report No. 904), papers from a symposium, March 1987, sponsored by the Conference Board, an international think tank, information service, and meeting convener for industry and business. Contributors include John A. Armstrong, Director of Research, IBM; Erich Bloch, Director, NSF; Keith R. McKennon, R&D Director, Dow Chemical; Edwin P. Przybylowicz, Director-Research, Eastman Kodak, and R. Roy Vagelos, Chairman and CEO, Merck & Co. Titles of other R&D-related publications from the Conference Board available on request.

Conference Board, Publication Sales, 845 Third Ave., New York, NY 10022; tel. 1-800-US-BOARD; in NY State 1-212-759-0900.

**National Research and Development Policies for 1988: The CORETECH Agenda** (34 pp. no charge), a financial and legislative wish list from the biggest R&D lobbying conglomeration on the Washington scene, CORETECH, which comprises some 75 universities, 50 major corporations, and several dozen professional and industrial associations and research centers (SGR April 15, 1987). The agenda includes bigger budgets for NSF, along with money for campus research buildings and equipment; extension of the R&D tax credit and basic research credit for industrial support of university research, both of which expire at the end of this year; acceleration of technology transfer from federal labs, and support for training more scientists and engineers.

CORETECH, 1735 New York Ave. NW, Suite 500, Washington, DC 20006-4759; tel. 202/628-1700.

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